SOCIO- ECONOMIC BENEFITS AND ENVIRONMENTAL IMPACTS OF THIKAROAD SUPERHIGHWAY

BY

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A research project submitted in partial fulfillment of the requirement for the degree of Bachelor of Environmental Planning and Management of Kenyatta University.

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DECLARATION

This research project is my original work and has not been submitted for the award of a degree in any other institution.

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DEDICATION

This work is dedicated to all those individuals and organizations that are contributing to Africa's development as well as the well being of the Environment for Sustainable Development.

ACKNOWLEDGEMENT

This report is what it is due to the generous contribution and assistance of some organizations, institutions, and individuals both in and outside Kenyatta University. Special recognition goes out to Mr. Nyaooro for his great efforts of supervising and leading me to accomplish this fine work.

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The hospitality and courtesy of all interviewee's cannot go unmentioned as this research would not be what it is if it were not for their contribution. Finally i would wish to portray my gratitude to all those individuals and organizations that directly or indirectly assisted in this work.

I thank the Almighty for all this was through his grace.

ABSTRACT

Road infrastructure is one of the key components of this development. In as much as new roads bring development to previously underdeveloped areas, sometimes this development can cause significant effects on sensitive environments and the lifestyles of the people living near or using the road. The transformation of the road from Nairobi to Thika town into a super highway is one of Kenya's first large scale transportation infrastructure projects which albeit its numerous benefits accrued, negative impacts can also be felt. The study aims at improving on the literature on the assessment of developments made in infrastructure in Kenya by investigating the socio-economic and environmental effects of the improvement of the Nairobi – Thika highway.

The study finds that development of the road has had various changes to the social, economic and environmental situation of the households and investors/ institutions located along the road. This changes have been mostly positive especially in reference to increased investment opportunities and greater markets but found to be negative in reference to the environment and in specific vegetation and wildlife as most of the areas under study were experiencing unplanned development of small businesses and investments.

The researcher recommends the use of environmental impact assessments to be used to a greater extent before the commencement of such projects and monitoring done during the progress of road development projects to reduce loss of wildlife and eco-balance. Policy development is needed for usage of road sections meant for business investments. Further research is also recommended in the regulations pertaining to road development.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the problem

Development is seen as an important component in any country's vision in the world, however it can have major impacts on the environment, social and economic life of the same countries. According to Schiefelbusch (2010) the environmental impact can be by degrading soils and waterways, altering landscape and destroying biodiversity and habitat. Other problems associated with development and human activity include land use conflicts, human and animal conflicts, water management and environmental pollution. In addition to harming the environment, these impacts can and do have significant economic costs and negatively affect human health.

Road infrastructure is one of the key components of economic development. Without good road development movement in an economy is critically impeded resulting to curtailing of the ferrying process of produce and other goods to the market, which in turn leads to transport bottlenecks that invariably hamper economic development. Roads have significant impacts on both nearby communities and the natural environment (World Bank, 2011). Burnett (2001) points out that there are numerous benefits to having proper road networks especially in the range of social and economic benefits while to a certain extent environmental benefits.

In as much as new roads bring development to previously underdeveloped areas, sometimes this development can cause significant effects on sensitive environments and the lifestyles of the people living near or using the road. The Construction of roads has

particular environmental impacts: erosion, traffic, noise, water pollution and work practices which need to be managed by road contractors (World Bank, 2011).

Environmental effects of roads may include spatial and temporal dimensions and biotic and abiotic components. Effects can be local (along a road segment) or extensive (related to a large road network). Spatial effects of roads vary because species habitat requirements and ecosystem characteristics are diverse. Road construction may negatively affect species, habitats and physical and chemical characteristics at the site and landscape levels. Road effects could have direct and indirect impacts. There are those common during construction, those along a newly completed road, and those with long-term impacts (Diagle, 2010).

The social impacts on the other hand and their distributional effects across various segments of society have traditionally been viewed as secondary or even tertiary concerns relative to economic and environmental impacts (Markovich and Lucas, 2011). While social economic impact assessment tends to focus on the avoidance of adverse social impacts, the assessment also provides a forum for planning how to maximize the beneficial impacts of a proposed development. Beneficial impacts can include: a better standard of living due to increased access to employment, business opportunities, training and education, greater access to and from a community and increased funding to improve programs.

On the economic impact Tsunkawa and Hoban (1997) note that the building of new roads, rehabilitating of existing roads and upgrading of road infrastructure all involve the use of economic resources which has to be taken in consideration when planning and

making decisions on development of roads. McKinnon and Woodburn (1993a) show that the clear implications of these developments are accompanied by various economic activities providing local employment and a source of employment in these sectors.

It is however expected in general that road development projects must be economically viable, socially acceptable and environmentally sound. Structured assessments of road developments can therefore help resource and land managers identify road-related benefits, problems, environmental risks, economic and social opportunities and trade-offs among possible management actions.

The transformation of the road from Nairobi to Thika town into a super highway is one of Kenya's first large scale transportation infrastructure projects. Recent assessments by the Kenya National Highway Authority have indicated that numerous benefits can be accrued to the construction of the highway, negative impacts can also be felt. The Kenya Alliance of Residents Association in a recent discussion on the road's development noted that the negative impacts such as frequent accidents, noise pollution and lack of proper drainage systems are major concerns (Kenya Alliance of Residents Association, 2012).

1.2 Statement of the problem

Development of transport facilities like road infrastructure, can play a significant role in changing the socio-economic conditions of the people of a region through dynamic externalities that such development often generates (Sengupta, Coondoo and Rout, 2007). It can in fact be an important element of both direct and indirect interventions for poverty reduction and improvement of socio-economic conditions of the people. In addition large amounts of money are allocated to the national and local authority roads programmes

with a general view that economic development as well as social and environmental gains are stimulated by new and expanded roads.

However, road construction for socio-economic and environmental development purposes has not been evaluated extensively against a number of policy alternatives that are more likely to advance the same objectives (Whitelegg, 1994). The ultimate aim of developmental activities, including those relating to transport infrastructure, is to promote societal welfare. However, due to the existing pattern of socio-economic structure, geo-political and historical features etc., the benefits of such developments are often not shared equitably and a variety of distributional inequalities show up at all levels-local, regional, or national (ibid).

The Nairobi- Thika highway improvement project aimed to address the problems of traffic congestion, traffic accident, air pollution and improve economic development. The rationale and articulated vision of improving this vital transport corridor was to improve the economic productivity and mobility of those living along the road while transforming Thika road into part of a Great North Trans-African from Cape Town to Cairo,facilitating regional trade and economic development.The users of the road benefit from reduced travel times.Heavy freight that transport ggods to other towns and even across borders benefit form the reduced travel times due to the separation of local and thruway traffic as well as the improved surfacing and design of the road.

However, several negative impacts are also beingexperienced due to the highway construction and if these problems are not addressed and remedies sought rather the construction of the highway could be deemed disadvantageous rather than

beneficial.Effects such as noise, water pollution, habitat destruvtion and disturbance, more road accidents,disruption of livelihoods and sky rocketing land values are not addressed;the construction could be rendered problematic.

The study therefore aims at improving on the literature on the assessment of developments made in infrastructure in Kenya by investigating the socio-economic and environmental effects of the improvement of the Nairobi –Thika highway.

1.3 Research questions

1. What are the socio-economic activities that have come up as a result of Thika Super highway?

2. Which environmental problems are associated with Thika Superhighway?

3. What are the other opportunities for investment along Thika Super highway?

1.4 Research objectives

The general objective of the study is to investigate the socio-economic and environmental effects of the Nairobi-Thika Highway Improvement Project. The study is further guided by the following specific objectives:

1. To assess the socio-economic activities that have come up as a result of Thika Super highway.

2. To examine environmental problems associated with Thika Superhighway.

3. To explore other opportunities for investment along Thika Super highway.

4. To prepare an action plan for the enhancement of socio-economic activities along Thika Super highway.

1.5 Research premises

1. Numerous socio-economic activities have come forth as a result of Thika Superhighway.

2. There are a number of environmental problems associated with Thika Superhighway.

3. Opportunities for investment have come up due to the road construction.

1.6 Justification of the study

Traditionally transport, usually interpreted as road construction, has been accorded a special place in government expenditures with an explicit claim that investments in this area increase economic success and accrue societal benefits to the areas transverse. In many developing and developed countries, roads and highways provide the dominant mode of land transport. They often carry more than 80 percent of passengers and over 50 percent of freight in a country.

Consequently, roads and highways form the back bone to the economy and provide essential links to the vast communities (rural, urban or mixed) into economic networks, making their development directly linked to those that reside near and those who use them. However, there has been little assessment of the socio-economic impacts of an infrastructural project like construction/ widening of a highway. It is generally thought

that the distributional equity should be dealt with through explicit fiscal policies and government programmes aimed at improving opportunities and reducing poverty.

Kenya has been in the forefront of improving its infrastructure network for the last 5 years, resulting to various benefits as well as challenges. It is therefore increasingly important that the socio-economic impact analysis with a thrust on distributional issues like environmental degradation and other societal matters be made to see how important the role of a transport or a ground infrastructural project may be.

The study intends to provide evidence of the impacts of such developments for the benefit of decision making in the future and for reference in such research.

1.7 Significance of the study

The study is significant to the Kenya National Highways Authority which is charged with the development of the road system in Kenya in identifying the implication of the developments that have been made so far on the Nairobi – Thika superhighway and this information can be used to come up with better policies and plans that will ensure that benefits are fully realized and negative effects of the road developments in Kenya's future are minimized.

The National Environment Management Authority which is mandated to ensure that developments made in Kenya are in line with environmental concerns will use the findings of the study to consolidate their own assessments that were made before the beginning of the improvement project.

Other researchers in the same study area will use the findings of the study as reference points for further study in the areas as well as use the literature in the study to guide their own studies.

1.8 Scope and limitations of the study

The study is limited to the environs along the stretch of Thika Road Superhighway, from Pangani area to Thika in Nairobi and Kiambu County. The study took up a descriptive approach in research at understanding the socio-economic and environmental impacts that the improvement of the Nairobi-Thika highway has had on the community that live and work near. The study based its findings on the major centers along the road (Annex I), targeting individuals, businesses and institutions that are located in those centers near the road.

1.9 Operational terms

Infrastructure - Facilities and services needed to sustain industry, residential, commercial, retail, and all other land use activities. This can be divided into transport infrastructure, telecommunications infrastructure and information society, energy infrastructures, spatial planning and rehabilitation, social and public health infrastructure.

Impact – An intended or unintended consequence of policies, programs, services or products, which is either positive or negative.

Social impact - involves positive and negative changes in peoples' cultural traditions and lifestyles, their physical and psychological health, their families, their institutions and their community.

Economic impact - the effect of an event on the economy in a specified area, measured in changes in business revenue, business profits, personal wages, and/or jobs.

Environmental impact - effects upon the environment, both temporary and permanent, of a significant development or project.

Action Plan – A sequence of steps that must be taken, or activities that must be performed well, for a strategy to succeed.

1.10 CHAPTER OUTLINES

Chapter One introduces the project. This chapter examines the background to the study, the statement of the problem, research problem and the objective of the study. The research objectives, research questions, justification of the study, scope, and limitations of the study as well as operational terms are also discussed.

Chapter Two gives information on the socio-economic benefits accrued as a result of highway improvements, the environmental problems and investment opportunities associated with road expansion and improvements. Theoretical and conceptual frameworks are also discussed.

Chapter Three explains the area of study which includes areas that the super highway traverses, giving maps and photographs to provide more detailed information on the physical, ecological, economic and social set up of the area under study.

Chapter Four describes the methods and procedures used during the study,most significant in achieving the set research objectives and goals as per the requirement of the study

Chapter Five discusses and shows the analysis and presentation of data collected in the field.It shows the socio-economic activities and benefits of Thika road super highway, the environmental problems associated with the roads improvement and investment opportunities associated with the highway.

Chapter Six gives the summary of the data, conclusion, long term and short term recommendations, areas of further studies as well as an action plan for enhancement of socio-economic activities and environmental problems along the highway.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Socio-economic impacts of road development

Todaro (1981), view development as a multi-dimensional process involving change in structure, habit attitude and institution as well as acceleration of economic growth. They illustrate a significant relationship between transportation and development process. However, the nature of interaction is still a subject of debate between scholars who say development depends on many factors such as availability of resources and level of technology. In all, transportation is of great significance to development in any society. An efficient transportation system is in many ways, the bedrock of any social and economic system in terms of improving the quality of life for the common person.

The transport sector can therefore be viewed an important component of the economy impacting on development and the welfare of populations (Weisbrod and Weisbrod, 1997). When transport systems are efficient, they provide economic and social opportunities and benefits that impact throughout the economy. When transport systems are deficient, they can have an economic cost in terms of reduced or missed opportunities. Transport also carries an important social and environmental load, which cannot be neglected. From a general standpoint, the economic impacts of transportation can be direct and indirect: Direct impacts related to accessibility change where transport enables larger markets and enables to save time and costs. Indirect impacts related to the economic multiplier effect where the price of commodities or services drop and/or their variety increases (ibid).

Transportation projects can take many forms (OECD, 2002). The traditional Cost Benefit Analysis (CBA) of transport analysis is based on engineering descriptions that provide useful information. Investment proposals usually specify the transportation mode(s) directly affected by the improvement. Generally, a variety of physical descriptions, such as number of lanes, length of improvement, type of materials used, and expected volume of traffic available, together with administrative and financial information including cost estimates and sources of funding are used in analysis of development impact on the socio-economics.

According to Banister and Berechman (2000) transportation developments that have taken place since the beginning of the industrial revolution have been linked to growing economic opportunities. At each stage of human societal development, a particular transport mode has been developed or adapted. However, it has been observed that throughout history that no single transport has been solely responsible for economic growth. Instead, modes have been linked with the direction and the geographical setting in which growth was taking place. For instance, major flows of international migration that occurred since the 18th century were linked with the expansion of international and continental transport systems. Transport has played a catalytic role in these migrations, transforming the economic and social geography of many nations. Concomitantly, transportation has been a tool of territorial control and exploitation, particularly during the colonial era where resource-based transport systems supported the extraction of commodities in the developing world.

Roads are clearly a critical enabling condition for improving living conditions in rural areas. However, the distribution of socioeconomic benefits resulting from a rural road is a

separate issue, and there are no guarantees or inherent mechanisms to ensure that these benefits will be distributed equitably between the poor and the non-poor in communities (Asian Development Bank, 2006).

Road construction activities themselves have been found to generate significant economic growth. According to the European Investment Bank's (EIB) 2002 study "Contribution of Major Road and Rail Infrastructure Projects to European Development", out of 14 road infrastructure construction projects, ten had a Return on Investment (ROI) of at least 13% and only one resulted in a net loss. Whereas, out of five rail infrastructure construction projects, with one exception, the ROI rate ranged between 0% and 4%.

Socio-economic impact assessment focuses on evaluating the impacts development has on community social and economic well-being (Edwards, 2000). This analysis relies on both quantitative and qualitative measures of impacts. Development impacts are generally evaluated in terms of changes in community demographics, housing, employment and income, market effects, public services, and aesthetic qualities of the community.

2.2 Environmental impacts of road development

Infrastructure, in general, defines as a set of facilities through which goods and services are provided to the public. Its installations do not produce goods and services directly but provide inputs for all other socio-economic activities. Infrastructure is the stock of basic facilities and capital equipment needed for the functioning of a country or area; the term to refer collectively to the roads, bridges, rail lines, and similar public works that are required for an industrial economy, or a portion of it, to function.

Economic and social development of Kenya is significantly dependent on efficient road transport infrastructure which facilitates delivery of agricultural produce, merchandise and commodities to markets as well as easy access to basic services (health, schools, water, trading centers, and administrative offices etc.) by the people. The benefits from efficient road transport are felt at all levels of the society, directly or indirectly, such as to include improved national economy, social income, wealth and job creation, health care, public transport and general service delivery. Improvement of all these areas is desirable for the current national aspirations including inter-sectoral growth collaborations (Perkins, 2011).

Success of Vision 2030 initiative is basically a function of the infrastructure, efficient road network being the key unit. Development of new roads and improvement of existing facilities have potential negative effects to the physical environment and social well being of the communities as well as natural habitats. Among the potential negative impacts from road construction projects could include: environmental pollution from construction activities, risk to health and safety of the residents and employees, demand of construction materials such as water, wood, gravel and hard stones; increased run off, socio-cultural changes including loss of farming land, changes of domestic and wild animals access to water point, demolition of structures, displacement of human settlement/commercial centres, interference with animal reserves and foot paths, increased traffic, increased ambient air pollution, increased potential for road accidents, increased surface run off, flooding and associated disasters among other impacts. Other anticipated impacts from road projects is disruption of natural habitats by interference of food chains and breeding sites and habitats, risks of fatal wildlife attack, displacement or

extinction of species, destruction of land, vegetation, introduction of exotic species and possible interference with natural eco-balance.

2.3 Investment opportunities arising from road development

The impact of a highway development on the activities that are accrued may be seen from the local impact and the wider regional or national level impact. The local impact is expected to be limited to the immediate neighbourhood of the highway – that is, to the towns and villages lying on both sides of the highway within a considerable distance. The entire regional or national economy lying beyond this neighbourhood should also benefit from the development in terms of the opportunities derived in increased resources (Weisbrod and Weisbrod, 1997).

Road development impact may be of a direct or indirect nature (Sengupta, et al., 2007). It may be mentioned in the context of indirect general equilibrium effects on income, output, employment, land rent and land price, poverty, etc. are realized not only in the local economies in the proximity of the highway, but are also transmitted throughout the regional, if not the national economy by way of various linkage effects.

The indirect impact of a highway development, on the other hand, would work through the dynamic developmental externalities generated through the forward and the backward linkages (Daigle, 2010). An example of this may be a change in the land use pattern in the areas that get greater connectivity due to the highway, since there will be changes in the patterns of settlement, agricultural land use and location of industries, trading and other services and non-farm unorganized sector activities.

2.4 Theoretical Review

Until the 1970s, infrastructure hardly existed as an analytic concept or category in economic theory and policy. However, in recent years due to the importance attached to it the provision and development of infrastructure has been subject of much theoretical analysis and empirical studies.

2.4.1 Theory of Social Overhead Capital (SOC)

Nurkse (1955) elaborated the concept of overhead capital defining that overhead investment aims at providing the services – transport, power, and water supply, which are basic for any productive activity. It is assumed in the theory that before building consumer goods factories, a major indivisible block of social overhead capital or infrastructure must be built and sponsored because private market initiatives will not create it in time

This investment according to Nurkse (1955) cannot be imported from abroad, is required in large quantities and involves costly installations and in the history of western economics outside England, have usually called for public assistance or public enterprise. Typically overhead investments take a considerable time to reach maturity in growing. To be sure, all investments depend on expectations but the time range of expectations is opt to be particularly long in overhead projects because of their lumpiness combined with their high operational capital intensity. Hirschman (1958) in a refined concept of social overhead capital (SOC) includes the basic services (like transportation, communication, power, health, water supply, irrigation and drainage system) without which the primary, secondary and tertiary activities in the economy cannot function.

According to Rostow (1960) SOC is a pre-condition for take-off into self-sustained growth. Investment in development of those services encourages potential entrepreneurs to invest in risk bearing business. Those SOC prepare the base for expansion of economic activities by decreasing the cost and increasing the profitability of productive activities. It also helps in the creation of an educated labour force, superstructures of communication networks, and mechanism to provide energy, basic civic amenities and law and order. The theory indicates that investment in such projects have a multiplier effect on activities that can be used to improve the socio-economic conditions of people near the developments.

According to Rostow (1960) all these create an atmosphere that breeds entrepreneurial capabilities and sustains a climate which is throbbing with economic activities and optimistic decision. In the precondition to take – off stage Rostow (1960) explained that the investment in social overhead capital should create literate and technically trained personnel in the working force. They are therefore a necessary condition for self sustaining economic growth.

2.4.2 Theory of unbalanced growth

Scholars such as Hirschman, Rostow, Fleming and Singer propounded the theory of unbalanced

growth as a strategy of development to be used by the underdeveloped countries. This theory stresses on the need of investment in strategic sectors of the economy instead of all the sectors simultaneously. According to the theory the other sectors would automatically develop themselves through what is known as “linkages effect”. This

linkages can be further defined in their social, economic and environment categories as having great importance to the development process.

Hirschman (1958) maintains that investments in strategically selected industries or sectors of the economy will lead to new investment opportunities and so pave the way for further economic development. He stresses that development to take place a deliberate strategy of unbalancing the economy should be adopted. This is possible by investing either in social overhead capital or indirect productive activities. Investments in social overhead capital are advocated not because of its direct effect on the final output, but it permits and invites Direct Productive Activities (DPA) to come in and therefore some SOC is required as a prerequisite of DPA investment.

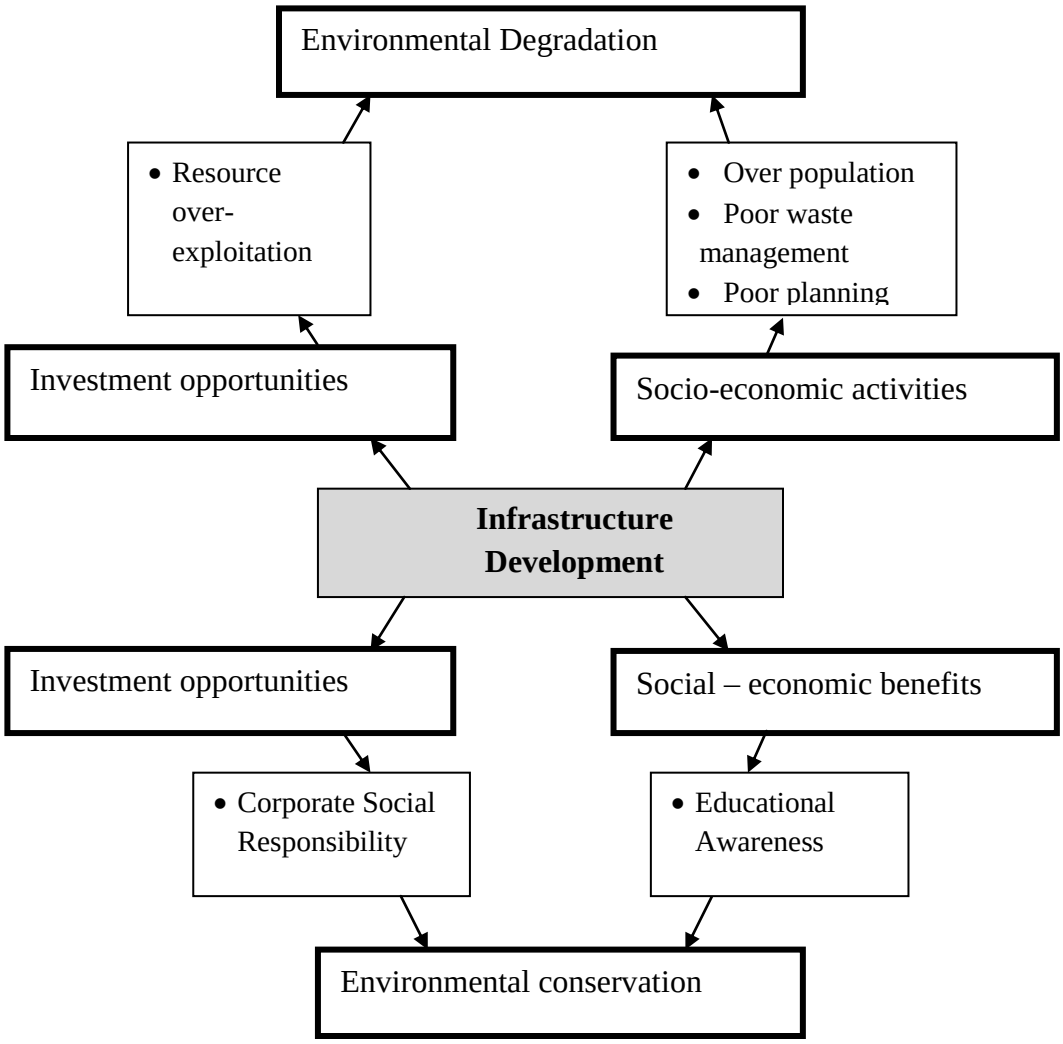
2.5 Conceptual Framework

Infrastructure development has both negative and positive impacts on the bio physical and socio-economic aspects of the environment as shown in figure 2.1. Socio-economic benefits associated with these development includes; facilitation of trade due to increased competition and better and diverse products , improvement of movement of people and goods and increased employment opportunities. Investments in the road sector benefit the whole society by providing access to territory and allowing poverty alleviation to take place. Consequently, the road network creates and stimulates positive synergy and enhances social cohesion and integration by giving citizens the same opportunities. Beneficiaries of infrastructure development appreciate the benefits and opportunities accrued by the improvement and thus readily take part in environmental conservation

through raising awareness and pursuing environmental education so as to continue enjoying the infrastructure as well as protecting the environment.

Road transport has undeniable socio-economic benefits, which are often underestimated with respect to their negative impacts. Owing to the fact that road transport is affordable and easily accessible leads to overpopulation thus leading to over crowding and congestion. Increase in population leads to increased housing development which may necessarily have not been planned for which may lead to poor waste management and inadequate provision of basic and social amenities .Increased investments may lead to resource over exploitation and depletion thus environmental degradation.

Figure 2.1: Conceptual Model



Source: Author, 2014

CHAPTER THREE

3.0 AREA OF STUDY

3.1 INTRODUCTION

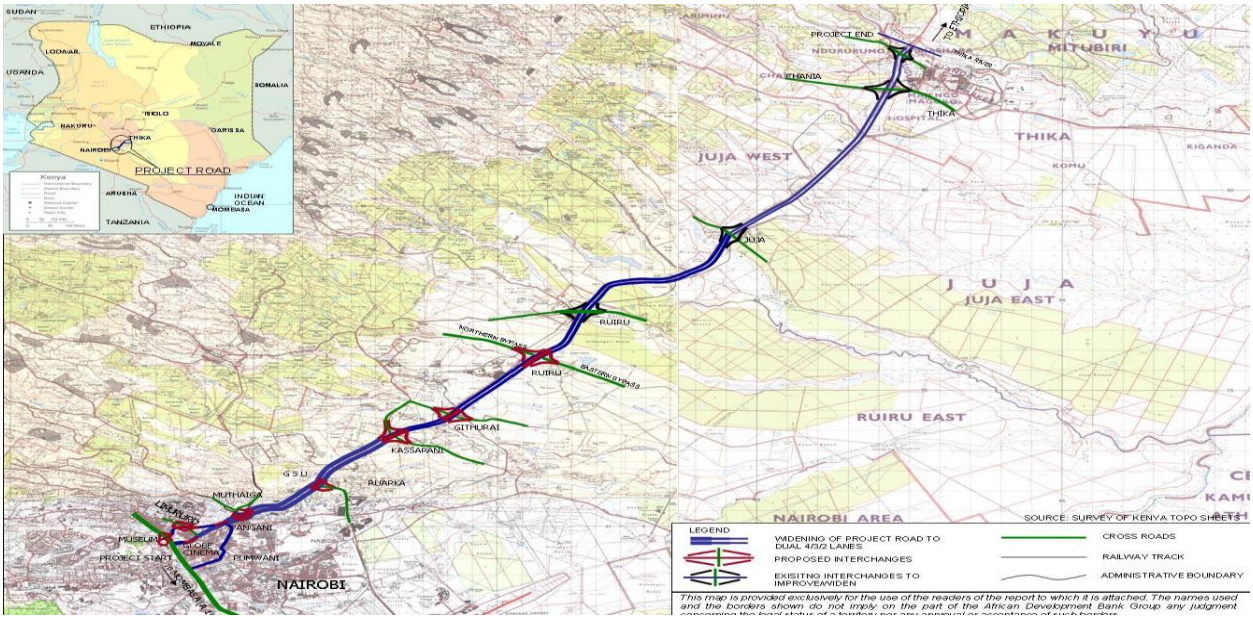
3.2 Physical set up

3.2.1 Location and extent

The Thika Road Highway is a 50.4 km long high capacity expressway which is part of the International Trunk Road linking Kenya to Southern Africa through Tanzania and Northern Africa through Ethiopia.

The road connects high potential industrial and commercial centres in Central parts of Kenya to the regional highway backbone (Northern Corridor), Kenya's International Airport, and three (3) major city arterial roads (JICA, 2006). The road extends through various satellite towns and economic hubs, including Ruaraka, Kasarani, Kiambu Town, Githurai, Ruiru, Juja and Thika. It starts in Nairobi on Uhuru Highway at three points namely Haile Selassie Avenue, University Way and Museum Hill Roundabout and converges at Pangani Roundabout on Thika Road. It then proceeds to Thika via Muthaiga, GSU, Kasarani, Githurai Roundabouts, Kenyatta University, Ruiru Town, Juja Town and ends at the bridge near Blue Post Hotel. The total project length is 50.4 km.

Plate 1: Thika road superhighway extent



3.2.2 Topography and drainage

Thika Road Highway is within the jurisdiction of Thika District. Thika district lies between latitudes 3°53′ and 1° 45′ south of Equator and longitudes 36° 35′ and 37° 25′ east. The elevation of Thika is 1531 meters (5026 feet) in altitude. The district covers an area of 1,960.2 sq Km². It borders Nairobi City to the south, Kiambu District to the west, Maragua District to the north and Machakos District to the east. The landscape covered by the road is generally level save for a few ridges and depressions in wetlands.

Although the Thika Road Highway in its developed form does not generate large amounts of waste it traverses 15 waterways from its origin in Thika to its terminus in Nairobi. However, the completed road has shown signs of poor drainage during the rainy season that has raised several questions about the construction of the road by the Chinese constructors.

Plate 2: Drainage during rainy seasons

3.2.3 Geology and soils

A large part of the area that has been affected by the development of the road has a rather monotonous topography underlain by volcanic rocks of relatively recent age. The volcanic area is, however, of importance as the volcanic rocks yield constructional materials, notably building-stone in the Thika to Juja area. The area consists of flat volcanic plains in the west and generally hilly country to the east, formed by dissection of the sub-Miocene and end-Cretaceous pen plains.

Soil types in the area are dependent on drainage; black-cotton soils develop in poorly drained regions while sandy soils and murrams form in well drained regions.

3.2.4 Climate

The average daily temperature throughout the year varies slightly from month to month with average temperatures of around 17 degrees Celsius during the months of July and August to about 20 degrees Celsius in March. In the past 50 years, the expected amount of rain produced in Thika and its environs towards Nairobi could be anywhere in the range of 500 to 1500 mm, with the average ringing in at 900 mm. Winds along the surface are predominantly easterly throughout the entire year. They are shifted to northeast between October and April, and they are shifted southeast between May and September.

3.3 Ecological set up

3.3.1 Agro ecological zones

The agricultural sector within the Nairobi-Thika Highway has industries such as coffee processing, fruit canning and juice extraction, flour milling, processing of tobacco products and many others.

3.3.2 Vegetation

The agriculture activities that are practiced within the jurisdiction of the highway include horticulture (exports mainly to Europe) and coffee industry (exports mainly to the USA and Europe). Other forms of vegetation include cotton, pineapples, macadamia nuts and wheat.

3.3.3 Wildlife

The main wildlife present along the road are in the form of rodents, snakes, insects, birds and other crawling animals. Other animals such as the hippopotamus and dik diks would

frequent the road at night passing from one side of a mash to another near Weteithie, Juja and Brookside before the road development.

3.4 Economical set up

3.4.1 Agriculture

The agricultural sector within the Nairobi-Thika Highway has industries such as coffee processing, fruit canning and juice extraction, flour milling, processing of tobacco products and many others.

3.4.2 Trade, commerce and industries

The commerce and industrial activities along the highway include agriculture, industrial, commercial and small scale entrepreneurship. Agricultural activities include: coffee, macadamia nuts and pineapple farming. Other horticultural activities include flower farming and food crop farming using irrigation. Large industries include food processing, vehicles manufacturing/assembling and metal industries. Thika town and other urban centres along the road have many large and small shops. The building construction industry along the road is also quite active.

Plate 3: Construction of Thika Road Mall at Roysambu

3.4.3 Tourism

Thika road is not identified as one of the areas that tourists visit but there are hotels, leisure lodges, parks and public areas where both domestic and foreign tourist visit. Thika where the road development stops is home to the Chania Falls and the Thika Falls, while Ol Donyo Sabuk National Park lies to its south east.

3.5 Social set up

The area which the road traverses has a large proportion of youthful population. The demand for facilities such as schools, hospitals and recreation facilities is already high and is poised to increase further in future. All forms of poverty including food and absolute poverty are being experienced and indeed, poverty incidence is taking an upward trend due to factors such as rising unemployment, collapse of agricultural sectors, collapse of industries, poor infrastructure and rise in HIV/AIDS cases. The poverty prevalence in the area stands at 48.4 percent.

CHAPTER FOUR

4.0 RESEARCH DESIGN AND METHODOLOGY

4.1 Research design

According to De Vos (1998) a research design is a blueprint or detailed plan of how a research study is conducted. The researcher will use a descriptive research design in gathering the data. Cooper and Schindler (2001) explain the design to be concerned with answering questions such as who, how, what which, when and how much.

The need to take up a descriptive study is because of its ability to ensure complete description of the situation, making sure that there is minimum bias in the collection of data and to reduce errors in interpreting the data collected.

4.2 Nature and Sources of Data

4.2.1 Nature of Data

4.2.1.1 Primary Data

Primary Data comprised of first hand information from direct observations, interviews of residents, resource persons including community based organizations and government agencies, local views and opinions. Activities undertaken within the area of interest were observed and noted. The information collected included the socio-economic activites that have come forth as a result of Thika superhighway, environmental impacts and investment opportunities arising from the road development.

4.2.1.2 Secondary Data

Secondary data included information about infrastructure development both at global and national level. Both published and non- published were used to provide a strong background to the study area

4.2.2 Sources of Data

Primary Data was sourced from relevant institutions such as The Municipal Council KENHA, NEMA, KURA and relevant government agencies.

Secondary data was sourced from both published and unpublished materials including national and county development plans, internet sources, relevant academic sources and books and journals obtained from libraries of various institutions.

4.3 Target Population

The target population is from Thika Road Superhighway (Appendix I) and the population is divided into businesses, individuals and institutions. The total population of the direct beneficiaries of the road are more than 1 million (AfDB, 2012). The researcher will concentrate the research on businesses registered and operating in the adjacent centers on the busy highway, institutions, road users and residents along the superhighway.

4.4 Sampling techniques and Procedure

Simple random sampling technique is an unbiased surveying technique adopted to achieve a representative sample. The research project used a sample size of 120 respondents drawn from the target population of businesses, institutions, road users and residents along the superhighway. In order to get accurate and reliable data and taking

into consideration the target population. Mugenda and Mugenda (2003) advocate for 10-30% of target population as representative sample within a population of less than 1000, 1-10% for populations over 1000 to 10000 and less than 1% for higher populations. The study therefore used a total of 120 respondents drawn from the more than 1 million beneficiaries of the highway which represents 0.001% of the target population.

Purposive Sampling focuses on a particular characteristic of population that are of interest.It was employed to select various investors, instsitutions and other relevant stakeholders in the enhancement of socio-economic benefits and management of environmental problems associated with the super highway.

4.5 Methods of data collection

1. **Direct Observation-** Observation involved watching people, events and activities carried out to see the trends of socio-economic activities carried out along the highway how they impact the environment and if all investment opportunities have been tapped.

2. Questionnaires- Both open and closed ended questionnaires were used to ascertain facts, opinions and practice about the study area. Open ended questions were used to elaborate further and included answers from respondents thus giving more detailed information and were better for eliciting sensitive information. Closed questions were used because of the precision and factual nature of answers provided. They included questions with multiple choices and therefore limits respondents to answer from the choices provided.

3. **Oral Interviews** – Oral interviews was used to supplement information from questionnaires and involved verbal interactions through formal and informal meetings between the researcher and respondents who varied from government agencies, municipal councils and investors.

4. **Photographs-** Photographs were used to capture key issues observed during the study and to provide a permanent record of the real situation on ground.

4.6 Data Analysis and Presentation

Both quantitative and qualitative methods were used to analyze the data gathered from the respondents. Respondent's perceptions, questionnaires and events were analyzed. Data was analyzed using descriptive statistics such as means, frequencies and percentages and later presented in form of tables, bar charts and pie charts.

CHAPTER FIVE

5.0 DATA ANALYSIS AND DISCUSSION

5.1 Socio-economic activities that have come up as a result of Thika Super Highway

The study sought to find out whether there were any new socio-economic activities that the users of the road had noticed. When asked whether there were any new socio-economic activities for road users that have been experienced since the beginning of the project, as shown in table 5.1, 100% of the household and investor respondents indicated yes whereby most households said increased and improved commercial activities and others increased housing sector i.e. more residential buildings. The investor respondents indicated the presence of more commercial activities, more residential buildings, more social amenities and more psv's and motor bikes as new socio-economic activities in the area after the development of the road.

Table 5.1 New socio-economic activities

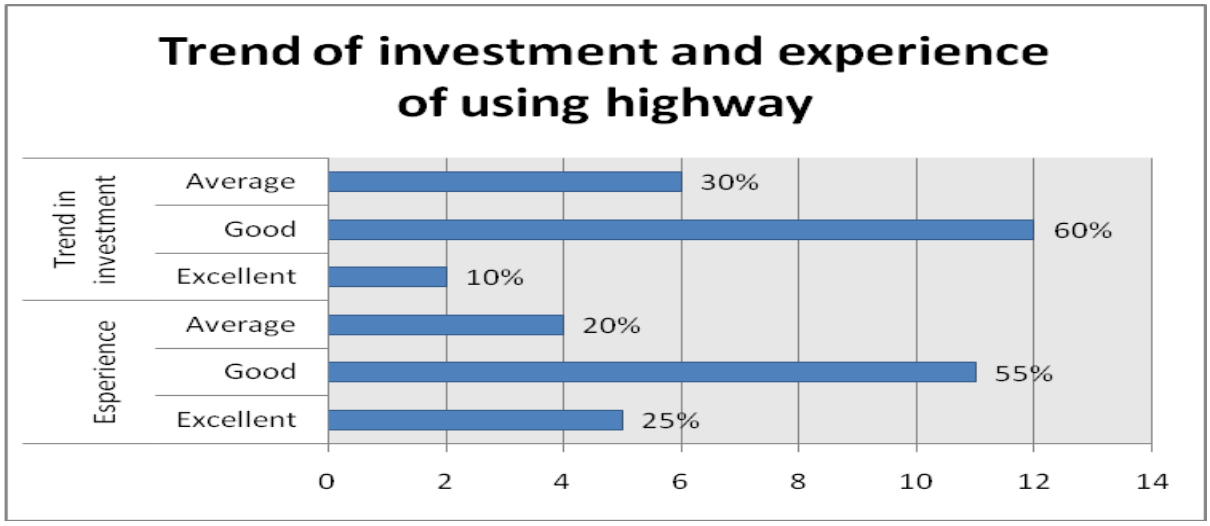
Presence of new socio-economic activities	Frequency	Percentage
Yes	40	100
No	0	0
TOTAL	**40**	100

Source (Field Data, 2014)

The experience of using the highway after the development by the majority (55%) of the household respondents was good whereas 25% had the opinion that it was excellent and

20% said that it was average. The data in figure 5.1 also shows that there has been a good trend in investment along the Thika Superhighway since the beginning of the development project as indicated by 60% of the investor respondents while 30% said that it was average and 10% said it was excellent. The development of the highway has therefore had a positive impact on the investments along the highway and the use of the road.

Figure 5.1 Experience of using highway and trend in investment

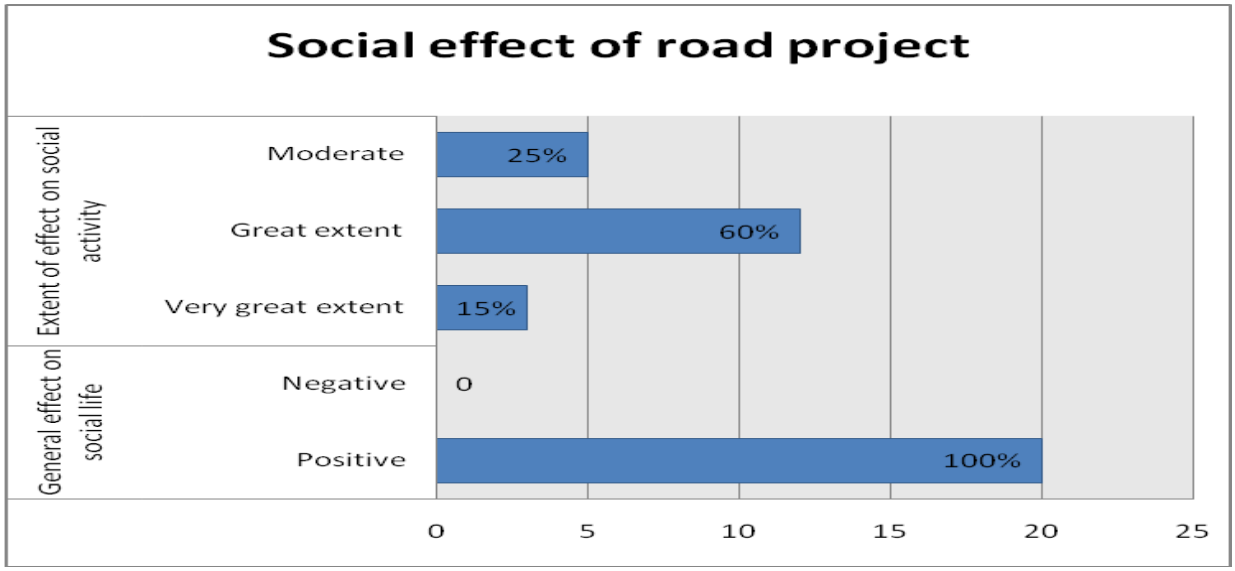


Source(Field Data,2014)

The general feeling was that the road development project had positively affected the social lives of road users along the Thika highway as shown by 100% in the figure 5.2 above while when asked what the extent of impact was on their normal social activities majority (60%) indicated that the road development had a great extent of effect while 25% said a moderate effect and 15% said a very great extent. The social well being of not only those living along the highway but even in the outskirts has been improved due to

the improved accesibilty. More job opportunities have been created thus improving the quality of life.

Figure 5.2 Social effect of road project



Source(Field Data,2014)

Hughway network provide important economic benefits to individuals and businesses.Improved reliabilty,quality and access of the highway network promotes effeciency in the economic sector.Certain economic benefits from highway networks include; employment supported by highway construction activities,direct user benefits accruing to commuters and travelers including time savings, safety improvements and vehicle operating cost reductions and increased industry productivity.

The data presented in table 5.2 indicated that majority of the companys/ investment had significantly improved in competitiveness since the start of the project in comparison to their competitors as shown by 70% who said their companies were now fairly competitive while 30% said they were highly competitive.Due to the population growth

along the highway,there is ready market for goods and services.Increased competition can also be due to the incresed industry productivity thus better and diverse products.

Table 5.2 Competitiveness of investments since start of road project

Competitiveness	Frequency	Percentage
Highly competitive	6	30
Not competitive	0	0
Fairly competitive	14	70
Total	**20**	**100**

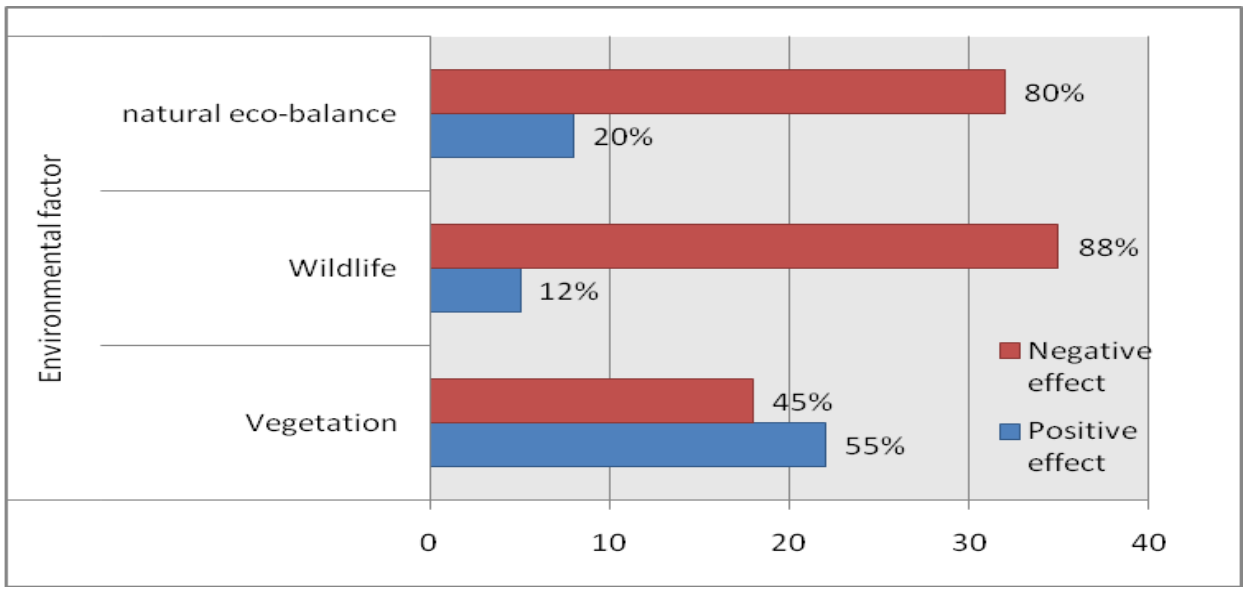
Source (Field survey, 2014)

5.2 Environmental Problems associated with road development

Highways may have adverse environmental impacts such as noise, water pollution, habitat destruction or disturbance and local air quality. Air pollution from fossil (and some biofuel) powered vehicles, road dust and emission of other hazardous pollutants such as carbon dioxide could have adverse respiratory health effects. Road noise can be a nuisance if it impinges on population centers, especially for roads at higher operating speeds. Highways act as barriers or filters to animal movement and thus can cause increased animal mortality. Urban run offs from roads and other impervious surfaces is a major source of water pollution. Rainwater running off to roads tends to pick up gasoline, motor oil, heavy metals, and other pollutants. Cutting through forests during road construction, destroys habitats and prevents the growth of trees as trees cannot grow through paved surfaces.

In terms of the impact the road development had on different aspects of the environment, the most negatively affected aspect was the wildlife as indicated by 88% of the investor and household respondents in figure 5.3 who said the road's development had a negative effect. Natural eco-blance was also highly indicated to have been negatively affected by the development by 80% while vegetation was seen to be more positively affected by 55% of the respondents in comparison to 45% who said it had experienced a negative effect.

Figure 5.3 Impact of road development on aspects of environment



Source (Field Data,2014)

When asked whether they thought the innovations being formed through the road improvement pose a threat to the environment, majority of the investors and household respondents (63%) said yes while 37% said it did not as shown in table 5.3.

Table 5.3 Innovations on road as threat to environment

Posing threat	Frequency	Percentage
Yes	25	63
No	15	37
Total	**20**	**100**

Source (Field Data, 2014)

When asked what were the main causes of environmental problems experienced along the superhighway by the users, lack of adequate controls was indicated to have a very great extent of impact by 85% as shown in table 5.4 while poor governance and lack of information were both indicated as having a great extent of influence on the problems by 50% each whereas stringent road regulations did not seem as a major factor as only 65% indicated a great extent to very great extent while 35% said moderate to not at all.

Table 5.4 Main causes of environmental problems

	Very great extent	Great extent	Moderately	Little extent	Not at all
Poor governance/ management	20%	50%	25%	5%	0
Lack of information	40%	50%	10%	0	0
Stringent road regulations	25%	40%	15%	10%	10%
Lack of adequate controls	85%	10%	5%	0	0

Source (Field Data,2014)

5.3 Investment opportunities arising from Thika Superhighway

Numerous investment opportunities have been realized as a result of the highway. Increased population has led to more residential, commercial and social facilities. Land has now been opened up to development opportunities and thus creating more jobs .Improved travel time and improved traffic flow has helped boost the area in terms of improved access and thus welcoming more investment opportunities.

When respondents asked whether the respondents were aware of any new investment opportunities for investors planning to invest along the road brought by improvements on the road, 100% said yes as shown in the table 5.5. The respondents indicated that accessibility had now been improved and population growth improved the market.

Table 5.5 Awareness of new investment opportunities

Awareness of new investments	Frequency	Percentage
Yes	40	100
No	0	0
Total	**20**	**100**

Source (Field Data, 2014)

CHAPTER SIX

6.0 SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATIONS

6.1 Summary of the findings

The focus of this study was on investigating the socio-economic and environmental effects of the Nairobi-Thika Highway Improvement Project. The research objectives in chapter 1 helped provide a suitable frame work for the literature review which focused on emirical literature on road development and its effects on socio-economic activities, environmental problems and on investment opportunities. The study identified the study area as the Thika Road Highway that extends through various satellite towns and economic hubs, including Ruaraka, Kasarani, Kiambu Town, Githurai, Ruiru, Juja and Thika. The study also paid attention to the various research methodologies which included the research design, data collection methods, procedures and analysis. The research design selected was the descriptive research design and a questionnaire was designed as the principle research instrument. Data obtained from the questionnaire was examined, analyzed and a presentation of the findings done in chapter five. Quantitative and qualitative methods of data analysis were applied to give an elaborate analysis that has meaning to the findings.

The study in relation to the first specific objective that was on assessing the socio-economic activities that have come up as a result of Thika Super highway, found that investors, households and investors have experienced increased and improved commercial activities such as increased housing sector i.e. more residential buildings, more social amenities and more psv's and motor bikes. The study found that the

experience of using the highway after the development by the majority (55%) of respondents was good while the trend of investment was considered good by 60% while 30% said that it was average and 10% said excellent. The road development project had also positively affected the social lives of road users along the Thika highway as shown by 100% of the respondents. The study also found that companys/ investments had not improved in competitiveness since the start of the project in comparison to their competitors as shown by 70% who said their companies were now fairly competitive while 30% said they were highly competitive.

The study in relation to the second objective that was to find out the environmental problems associated with construction of the road, found out that in terms of the impact the road development had on different aspects of the environment, the negatively affected aspects were the natural eco-balance as indicated by 85% of households and 75% of the investors who said a negative effect. Wildlife was also said to have been negatively affected by the development by 75% of the household respondents and 100% of the investors while vegetation was seen to be more positively affected by 60% of the household respondents and 50% of investor respondents. The innovations being formed through the road improvement were considered to pose a threat to the environment by majority of the respondents (60% of households and 65% of investors). The study also found that the main causes of environmental problems experienced along the superhighway were lack of adequate controls, poor governance and lack of information.

In relation to the third objective that was to find out the opportunities for investment that have come up due to the road construction, the researcher found out that developments made by the government in the road's construction had opened the market for new

ventures to start in various sectors including textile, construction, food and beverage and others.

6.2 Conclusion

The study aimed at understanding the the socio-economic and environmental effects of the Nairobi-Thika Highway Improvement Project. The researcher can conclude that the development of the road has had various changes to the social, economic and environmental situation of the households and investors/ institutions located along the road. This changes have been mostly positive especially in reference to increased investment opportunities and greater markets but found to be negative in reference to the environment and in specific vegetation and wildlife.

6.3 Recommendations

6.3.1 Short term recommendations

- The researcher recommends the use of environmental impact assessment is taken up more frequently before the beginning and during the progress of road development projects. It may be an expensive venture at the beginning but is an investment that bears fruit of community members and investors/ institutions along the developments as well as for the betterment of the entire community.

- The researcher also recommends for use of forums that bring together government officials in charge of road constructions, contractors and the road users (investors and households) to iron out issues that may affect the relationships of the users and construction plans as well as highlight areas where all stakeholders can work together

such a in wildlife conservation and enhancing the bio-diversity during and after road construction.

- The researcher also recommends for policy development for use of road sections for business investments as most of the areas under study were experiencing unplanned development of small businesses and investments.

- The study calls for partnership working between the developers and planning authorities to make sure new developments do not pose any threat to neither the road users nor the environment.

- There is need for government agencies responsible for road development to have discussions with developers before they even submit their plans so as to check whether they are in conmfomity with stipulated policies and regulations.

6.3.2 Long term recommendations

- The Environmental Impact Assessment system should be improved to have up-to-date environmental information, which can best be provided through local experts drawn from different disciplines.

- The researcher also recommends an improvement to the drainage systems.

- The researcher recommends for monitoring of the environmental impacts such as the air quality and water resources standards and dissemination of the ssame information to the public to increase awareness.

- . The Local Authorities have the power to refuse/accept development proposals/applications directly. The authorities must consult the Highway Authority . It is

the Highway Authority's role to give highway observations on whether a development will have a detrimental impact on traffic, road safety and the environment.

- In the long term it is necessary to apply restrictions on new developments or expansion of existing ones to avoid any adverse effects on the environment and road users

6.4 Areas of further studies

- The researcher would also recommend further research into the regulations pertaining to road development and the environmental impact it has in areas where the development occurs and the awareness of this regulations amongst community members and investors.
- More studies should be done on how road users can be used to improve the bio-diversity of areas that are affected by road construction
- More studies should be done on design quality and future maintenance of highways so as to continue enjoying the benefits of highways without degrading the environment.
- There is need for further research on how public participation can be invoved in road development so as to achieve occupants and users satisfaction.

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APPENDICES

Appendix I: Action Plan

Issues	Recommendation	Activities	Timeline*	Actors	Benefits
Increased market and investment opportunities	Create policies that govern the business expansion along roads and allocate areas for business expansion	• Conduct assessments of the areas where the markets have been increased • Etablish partnership with local communities on how best to utilise this new markets and areas of expansion. • Create policies that will create an equal playing ground for all investors	ST	- County Governments - Line Ministries	Well designed and controlled investments along developed roads. Improved socio-economic status of population.
Loss of wildlife and vegetation	Use environmental assessments to ensure that road construction does not affect the wildlife.	• Conduct environmental impact assessments specifically on number and type of wildlife along a road before development. • Establish ways to mitigate their loss with all relevant stakeholders. • Replace any loss of wildlife so as to ensure balance of eco-system if affected.	MT	- Line Ministries - Community - Contractors	Reduceed loss of wildlife and eco-balance Improved tourist numbers

Adequate controls in road use	Sensitise community and institutions along the road on need of adherence to rules and regulation.	• Create awareness on current laws governing road development and usage. • Sensitise users of roads on road management and proper use of roads as a resource. • Increase information on road development and use to community and institutions.	MT, LT	- County government - Contractor - Line ministries	Sustainable use of road, resources near the road such as rivers and reserve spaces along the road.
Policy framework	Develop policies exploring involvement of contractors in community sensitisation on road development and use.	• Establish areas where contractors and community can discuss challenges both parties are experiencing • Provide avenues for forums where community and institutions can increase participation in road development especially in environmental issues.	LT	- Line ministries - County government	Increase road users understanding and appreciation of road development process.
Monitoring of transport infrastructure	Invest in monitoring devices on major sections of road infrastructure	• Design indicators to indicate trends in road use. • Invest and implement in monitoring devices such as cameras and personnell.	LT	- County Governments - Line Ministries	Enhance road management and reduce misuse of road facilities.

Road and personal safety	Create policies that govern road safety	Create policies that will ensure road users safety	M T	- Line ministries - Governament agencies	Reduced acccidents and improved road users safety
Change in Land use	Use environmental assesments to ensure that developments dont affect the environment	• Conduct environmental impact assessments so as to note the possible adverse affects and come up with mitigation measures • Involve public participation	LT	- Line ministries - County Governments - Community	Reduced change of character of an environ

Key	
ST	Short Term
MT	Medium Term
LT	Long Term

Appendix 2: Questionnaires

HOUSEHOLD QUESTIONNAIRE

Questionnaire No. _____

Eva Muthoni Wanjiku is a final year student taking a bachelor degree in Environmental Planning and Management. According to the school curriculum, she is required a research project as a part of training and development of skills and her research topic is on "Socio-economic benefits and environmental impacts of Thika Superhighway". This survey is part of an academic research project to investigate the socio-economic and environmental effects of the Thika-Nairobi Superhighway improvement project. Please express your opinion openly and honestly. Your responses will remain confidential and will not be shared with anyone else, except for the sole purpose of this study. We appreciate your assistance and co-operation in completing this study.

Sec One –Background Information

1. Gender? Male { } Female { }

2. Age in years

18-25 { } 31-35 { } Above 40 { }

26-30 { } 36-40 { }

3. Educational level

Primary level { } Certificate { } Degree { }

Secondary school { } Diploma { }

Part Two: Main socio-economic activities

1. Do you think there are any new socio-economic activities for road users that have come up after the commencement of the improvement project?

Yes ( ) No ( )

2. If yes, which one is major?

……

……

3. What has been the experience of using the superhighway since the project began?

Excellent ( ) Average ( )

Good ( ) Below average ( )

4. How has the improvement of the road affected you socially?

Negatively ( ) Positively ( )

5. To what extent has the project impacted on your normal social activity?

Very great extent ( ) Great extent ( ) Moderately ( )

Little extent ( ) Very little extent

Part Three: Environmental problems

6. What effect would you say the road project has had on major environmental factors along the road? (tick where appropriate)

Environmental factor	**Positive effect**	**Negative effect**
Vegetation		
Wildlife		
Weather		
natural eco-balance		

7. Do you think the innovations being formed through the road improvement pose a threat to the environment?

Yes ( ) No ( )

Please explain your answer?

……

8. In terms of the environmental problems that are experienced along the superhighway by the users, please indicate to what extent you think the following factors would be the main cause?

Factor	**Very great extent**	**Great extent**	**Moderately**	**Little extent**	**Not at all**
Poor governance/ management					
Lack of information					
Stringent road regulations					
Lack of adequate controls					

Part Four: Investment Opportunities

9. Do you think the improvement of the road has brought any new investment opportunities for its road users?

Yes ( ) No ( )

Please explain

……
….

10. Do you think that users of the road will fully benefit from the improvements through more investment opportunities?

Yes ( ) No ( )

******* Thank you for taking time to fill in this questionnaire ********

Appendix 3: INVESTOR/ INSTITUTION QUESTIONNAIRE

Questionnaire No. _____

Introduction

Eva Muthoni Wanjiku is a final year student taking a bachelor degree in Environmental Planning and Management. According to the school curriculum, she is required a research project as a part of training and development of skills and her research topic is on "Socio-economic benefits and environmental impacts of Thika Superhighway". This survey is part of an academic research project to investigate the socio-economic and environmental effects of the Thika-Nairobi Superhighway improvement project. Please express your opinion openly and honestly. Your responses will remain confidential and will not be shared with anyone else, except for the sole purpose of this study. We appreciate your assistance and co-operation in completing this study.

Sec One –Background Information

1. Type of investment made/ intended to make?

Real estate { } Corporate (e.g insurance, bank) { }

Business { } Other ……

2. Period in operation

Less than 1 year { } 1-5 years { } 6-10 years { }

11-20 { } Above 20 { } (Specify)…….

Part Two: Main socio-economic activities

3. Do you think there are any new socio-economic activities that have been experienced along the Thika Superhighway after the commencement of the improvement project?

   Yes ( ) No ( )

If yes, which one is major?

……

……

4. What has been the trend in terms of investment into the area since the project began?

Excellent ( ) Average ( )

Good ( ) Below average ( )

5. How competitive would you say your company has become since the start of the project in relation to other competitors?

Highly Competitive ( ) Not competitive ( )

Fairly Competitive ( )

Part Three: Environmental problems

6. What effect would you say the road project has had on major environmental factors along the road? (tick where appropriate)

Environmental factor	**Positive effect**	**Negative effect**
Vegetation		
Wildlife		
Weather		
natural eco-balance		

7. Do you think the innovations being formed through the road improvement pose a threat to the environment?

Yes ( ) No ( )

Please explain your answer?

……

8. In terms of the environmental problems that are experienced along the superhighway, what would you say is the main cause?

Poor governance/ management ( ) Lack of information ( )

Stringent road regulations ( ) Lack of adequate controls ( )

Other

……

……

Part Four: Investment Opportunities

9. Do you think the improvement of the road has brought any new investment opportunities for investors planning to invest along the road?

Yes ( ) No ( )

Please explain

……

….

10. Do you think that companies located near the road will fully benefit from the improvements through more investment opportunities?

Yes ( ) No ( )

11. Do you think that the same opportunities being experienced by investors located near the road would be experienced without the improvement?

Yes ( ) No ( )

Please explain

……
….

******* Thank you for taking time to fill in this questionnaire ********